Listeria monocytogenes bacteremia in a twin pregnancy with differential outcome: fetus papyraceus and a full-term delivery

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A 41-year-old Saudi woman, gravida 7, para 5, aborta 1 with sickle cell disease at week 12 of gestation of diamniotic dichorionic twin pregnancy was admitted with fever. Blood cultures grew Listeria monocytogenes. She was treated with intravenous ampicillin and had death of one of the fetuses after 10 days. An ultrasound at 19 weeks of gestation showed a normal intrauterine gestation and the presence of significantly collapsed second twin gestational sac consistent with fetal papyraceus. At 37 weeks of gestation, she had a cesarean section and a full-term baby was delivered. We describe the case and review the literature on pregnancy-associated listeriosis.

Key words: Diseases in twins; Fetal death; Listeria; Listeria monocytogenes; Pregnancy complications, infectious

Introduction

Listeria monocytogenes, a Gram-positive bacterium, is the causative organism of human listeriosis. The organism causes gastroenteritis, materno-fetal infections, and meningoencephalitis through its ability to cross the intestinal, placental, and blood-brain barriers, respectively [1]. Listeriosis in pregnancy usually occurs during the third trimester, secondary to a major decline in cell-mediated immunity [2]. However, listeriosis has been rarely observed during the first trimester [3]. In addition, listeriosis during pregnancy rarely spares the fetus or the neonate [4]. Here, we present an unusual case of L. monocytogenes infection during the first trimester in a twin pregnancy resulting in demise of one fetus and subsequent delivery of a full-term second fetus.

Case Report

A 41-year-old Saudi lady, gravida 7, para 5, aborta 1, with sickle cell disease and a twin pregnancy at 12 weeks was admitted with fever. She had a 4-day history of fever, chills and generalized fatigability. The patient had no urinary, gastrointestinal or respiratory symptoms and no skin rash. Physical examination revealed a temperature of 38°C and no other abnormalities. White blood cell count was 2800/mm³, hemoglobin 9.1 g/dL, platelets 165,000/mm³, and neutrophils 75%. Blood cultures grew L. monocytogenes. Intravenous ampicillin 2 g 4-hourly was started. Initial ultrasound at 12 weeks of gestation showed a gravid uterus with diamniotic dichorionic twin live pregnancy with normal amniotic fluid (Fig. 1). Ten days after admission, one of the fetuses died. However, the patient had no abdominal pain, no vaginal bleeding, and no symptoms referable to sickle cell disease. The patient received intravenous ampicillin for 2 weeks, and was subsequently discharged home. An ultrasound at 19 weeks of gestation showed a normal intrauterine gestation and the presence of significantly collapsed second twin gestational sac containing a dead fetus. Both the head and body appeared completely disorganized and were consistent with fetal demise (Fig. 2).

At 37 weeks of gestation, the patient was admitted for induction of labor for severe oligohydramnios. However, the fetus showed severe variable decelerations and thus an emergency cesarean section was done. A baby girl was delivered weighing 2150 g with...
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an Apgar score of 9 at 1 and 5 minutes. The patient had a smooth postoperative course and was discharged home in excellent condition.

Pathological findings
The placenta showed an umbilical cord with 2 arteries and 1 vein. Fetal mesenchymal and epithelial remnants, including immature cartilage, bone and muscle with foci of necrosis and calcifications, were present. Scattered hemosiderin-laden macrophages were also present. The microscopic features were consistent with sclerotic atrophic placenta with fetus papyraceus, indicating second trimester intragestational fetal loss in a twin pregnancy.

Discussion
L. monocytogenes infections can be life-threatening in neonates, pregnant women, elderly persons, and all immunosuppressed patients [2]. The majority of cases of listeriosis are food-borne through contamination of raw vegetables, raw milk, fish, poultry, and beef by L. monocytogenes [5]. Infection with L. monocytogenes in pregnancy usually occurs during the third trimester, as the result of the reduction in cell-mediated immunity [2]. In addition, L. monocytogenes may rarely cause disease in the second trimester [6]. Similar to the present case, listeriosis has been reported in the first trimester [3,7]. The clinical presentation of listeriosis in pregnancy may be an isolated episode of fever in 48% of patients, or a flu-like syndrome in 61% of cases [8]. In the third trimester, pregnant women present with a nonspecific acute febrile illness and may have myalgias, arthralgias, headache and gastrointestinal symptoms [9]. In a study of 11 pregnant women with listeriosis, 9 patients were in the third trimester and 2 patients in the 17th and 18th week of gestation, respectively [8]. The latter 2 pregnancies ended in a spontaneous abortion in one and early death of a preterm delivered baby in the other [8]. The patient in the current report is interesting since there was a differential outcome of the fetuses. While one fetus died in utero during the 13th week of gestation, the other fetus achieved a full term and was born without evident damage. The risk of listeriosis in pregnant women with multiple gestations is higher than in women with singleton pregnancies. In a study of 301 perinatal listeriosis, 12 cases (4.0%) occurred in pregnant women with multiple gestations. The rates of listeriosis in pregnant women per 100,000 live births and fetal deaths were 19.8 for singleton and 74.9 for multiple gestations (risk ratio, 3.8; 95% confidence interval [CI], 2.1-6.8). Greater risk of listeriosis was observed in pregnancies with triplet gestations (risk ratio, 38.4; 95% CI, 9.6-153.3) than in those with twin

Fig. 1. Initial ultrasound at 12 weeks of gestation shows normal viable intrauterine twin pregnancy. (A) Twin A. (B) Twin B.

Fig. 2. Ultrasound at 19 weeks of gestation shows normal intrauterine live gestation (A) and the presence of a significantly collapsed and completely disorganized second twin gestational sac containing a dead fetus (B).
gestations (risk ratio, 3.2; 95% CI, 1.7-6.0) [10]. In addition, the patient in the present report was 41 years of age and was gravida 7. In one study, listeriosis was more likely in patients over 35 years (risk ratio, 13.6) and 36% of the affected women had a gravidity of ≥5 (risk ratio, 2.9) [10].

The most important complications of listerial infections in pregnancy include fetal distress, abortion, premature birth, fetal or neonatal death, as well as the listerial infection of the neonate [11,12]. L. monocytogenes has a particular predilection to the placenta and the central nervous system, and seeding of these sites occurs during the bacteremic phase of the disease [2]. Perinatal listeriosis results in stillbirth or neonatal death in 22% of cases [8,13]. The present case is interesting since the infection occurred in the first trimester and death resulted in only one of the fetuses. The exact reason for this differentiation in the outcome of the fetuses could not be determined.

In a previous study of listeriosis in multiple gestations, 67% of cultures (8/12) were discordant for infection [10]. Such a discordant outcome is also observed in viral infections, such as herpes simplex virus, rubella and cytomegalovirus [10]. L. monocytogenes uses the villous syncytiotrophoblast to cross the maternal-fetal barrier [14]. Once transplacental migration of the organism occurs, L. monocytogenes may cause villous necrosis and microabscesses and may result in direct infection of the fetus, with subsequent fetal death [15]. Transplacental migration of L. monocytogenes can lead to disseminated granulomatosis lesions of the newborn [16]. Fetus papyraceus is a rare condition and a differential outcome with intrauterine fetal death was described in the second trimester of pregnancy [17]. However, we are not aware of any previous reports of fetus papyraceus and the delivery of a second twin in relation to L. monocytogenes infection.

Almost all strains of L. monocytogenes are susceptible to most common antibiotics. However, the cure rate is only approximately 70% [18]. The most effective therapeutic agents are combination of an aminopenicillin (amoxicillin or ampicillin) plus an aminoglycoside [18]. However, pregnant women with isolated listerial bacteremia can be treated with ampicillin alone (2 g intravenously every 4 h). Patients who are allergic to penicillin can be skin tested and desensitized, or treated with trimethoprim-sulfamethoxazole (5 mg/kg of the trimethoprim component intravenously every 6 h). However, trimethoprim-sulfamethoxazole should be avoided in the first trimester and in the last month of pregnancy due to the risk of kernicterus in the fetus. In this situation, vancomycin is the preferred option [19].

Pregnant women are usually not aware of the risk of listeriosis and they do not take precautions to prevent listeriosis during their pregnancy [18]. Thus, it is important that pregnant women are educated about the risk of listeriosis and the necessary precautions, including dietary guidelines on avoiding high-risk foods [20].

In conclusion, L. monocytogenes infection in pregnancy usually occurs during the third trimester and has been rarely observed during the first trimester. Moreover, Listeria infection during pregnancy rarely spares the fetus or the neonate. The reported case is thus unusual in occurring in the first trimester and resulting in the demise of only one of twin fetuses.

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References